MCNPX Capabilities Beyond MCNP4C3

Each successive version of MCNPX adds new capabilities and modernizes the code for new hardware, operating systems, and compilers. The capabilities of MCNPX beyond MCNP4C3 are now listed, grouped according to MCNPX version. Initials of principal developers are shown in parentheses.[1] For completeness we also list the capabilities and principal developers of MCNP and MCNPX since MCNP4B.

MCNPX 2.5.c (April 2003)

- MPI multiprocessing (JL/GWM);
- I,J,K lattice indexing in geometry plots (JSH),
- Enable weight window generator in physics model region (FXG/JSH);
- Enable exponential transform in physics model region (FXG/JSH);
- Extend neutron model physics below 20-MeV (JSH);
- 3-He coincidence detector modeling (HGH/JSH);
- F90 Autoconfiguration (TLR);
- Corrections/enhancements/extensions.

MCNPX 2.5.b (November 2002)

- CEM2k physics (SGM/AJS/FXG);
- Mix and Match (JSH);
- Positron Sources (HGH);
- Spontaneous Fission (JSH);
- Corrections/enhancements/extensions.

MCNPX 2.4.0 (August 2002)

- FORTRAN 90 modularity and dynamic memory allocation (GWM);
- Distributed memory multiprocessing for the entire energy range of all particles (GWM);
- Repeated structures source path improvement (LLC/JSH);
- Default dose functions (LSW/JSH);
- Light-ion recoil (JSH);

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[1] Kenneth J. Adams (KJA) , Leland L. Carter (LLC), Skip Egdorf (HWE), Thomas J. Evans (TME), Jeffrey A. Favorite (JAF), Franz X. Gallmeier (FXG), John S. Hendricks (JSH), H. Grady Hughes (HGH), Julian Lebenhaft(JL), Robert C. Little (RCL), Stepan G. Mashnik (SJM), Gregg W. McKinney (GWM), Richard E. Prael (REP), Teresa L. Roberts (TLR), Arnold J. Sierk (AJS), Edward C. Snow (ECS), Laurie S. Waters (LSW), Christopher J. Werner (CJW), and Morgan C. White (MCW).

- Enhanced color geometry plots (GWM/JSH);
- Photonuclear cross-section plots (JSH);
- Proton cross-section plots (JSH);
- Proton reaction multipliers with FM cards (JSH);
- Photonuclear reaction multipliers with FM cards (JSH/GWM);
- Some speedups (GWM/JSH);
- Logarithmic interpolation on input cards (JSH);
- Cosine bins that may be specified in degrees (JSH);
- Cosine bins may be specified for F2 flux tallies (JSH);
- Source particles that may be specified by descriptors (JSH);
- Pause command for tally and cross-section plots (JSH); and
- Correction of all known MCNPX and MCNP4C bugs/problems.

MCNPX 2.3.0 and previous MCNPX versions (1995-2001)

- Physics for 34 particle types (HGH);
- High-energy physics above the tabular data range (REP);
- Photonuclear physics (MCW);
- Neutron, proton, and photonuclear 150-MeV libraries and utilization (RCL);
- Mesh tallies (tally in a superimposed mesh) (LSW/ECS);
- Radiography tallies (JSH/ECS);
- Secondary-particle production biasing (ECS); and
- Autoconfiguration build system for compilation (TLR/HWE).

MCNP4C3, MCNP4C2, and MCNP4C features added after MCNP4B (1997-2001)

- PC enhancements: Linux and Windows capable (LLC/GWM);
- Easier geometry specification with macrobodies (LLC);
- Interactive geometry plotting (JSH);
- Improved variance reduction with the superimposed mesh weight window generator (TME/JAF/JSH);
- Superimposed mesh plotting (JSH);
- Delayed neutrons (CJW);
- Unresolved resonance range probability tables (LLC/RCL);
- Perturbations for material-dependent tallies (GWM/LLC/JSH);
- ENDF/B-VI extensions (MCW);
- Electron physics enhancements (upgrade to ITS3.0) (KJA/HGH);
- Weight window enhancements (JSH/JAF); and
- Distributed memory multiprocessing (GWM).